

THE TREATMENT OF SIMPLE FRACTURES AROUND AND PENE- TRATING INTO THE JOINTS.

After speaking of the unfavorable prognosis of simple fractures penetrating joints, Professor Max Oberst, of Halle, gives¹ as the chief causes of the frequent ankylosis the following :

1. The prolonged rest of joint used in the treatment of the fracture.
2. The inflammation following the traumatism.
3. The over-production of callus.
4. The ordinary intra- and extra-capsular blood extravasation associated with the fracture.

As a result of prolonged immobility of a joint, from whatever cause, there often result serious disturbances in which the neighboring soft parts, as well as the joint itself, are associated. The muscles become contracted, and as a result, permanent and often pronounced tissue changes follow. Fasciæ, ligaments and capsule become shortened, while the cartilage where it comes in contact with its neighbor remains sound, the part out of contact becomes fibrous or stringy, and at the border of the synovial membrane begins a connective tissue proliferation which often interferes with the cartilage, and in the worst cases causes obliteration of the joint cavity.

Another cause of stiffness and ankylosis of a joint is the inflammatory processes following the injury.

There is often an accompanying hæmarthrosis due either to the contusion, to rupture of the ligaments, dislocation of the joint, or to the fracture entering the articulation, and especially are inflammatory conditions caused by a more or less marked dislocation of the fragments.

Over-production of callus has often been ascribed as a cause of

¹Volkmann's Sammlung klinischer Vorträge, No. 311.

stiffness of joint, and in fractures within the joint this is without doubt over-estimated, for, according to Bruns, in these cases the callus only fills up the fissure in the bone, and in only extremely rare cases does it assume the form of an exostosis.

In cases where the fracture is situated entirely or for the most part outside of the joint over-production of callus is almost a rule, and is especially seen where there is much displacement of fragments.

Hæmarthrosis is always present in fractures penetrating the articulation, as in most, if not nearly all fractures around a joint.

Volkman has often called attention to the disastrous consequences of blood within the articular cavity, and has proven that complete ankylosis, with total obliteration of joint, can result, even when the blood has become coagulated and organized.

Blood exudations outside of the capsule, may also be a source of danger to the future function of the limb, for when extravasated within the sheaths of tendons it may become organized and cause adhesions between the tendon and its envelope.

For the prevention of ankylosis or stiffness of the articulation after a fracture, Professor Oberst insists on the following points :

1. The extravasation of blood must be done away with as rapidly and as completely as possible.
2. The deformity reduced and the fragments held in place by proper dressings.
3. The joint must not be immobilized for too long a time

When prolonged immobility is deemed necessary, carefully performed passive motion ought to be made at least once a week.

Where there is much blood extravasated it is to be removed either by aspiration or, if this is out of question, methodical compression and massage are to be used. Methodical compression is applied by means of Martin's rubber bandage, care being taken that the fragments are in proper position, and that the important vessels are protected from pressure.

The good effects of methodical compression are greatly enhanced by massage.

In treatment of Colles' fracture, Prof. Oberst proceeds as follows ;

The displacement having been entirely reduced, the hand and forearm are fastened on a splint which is so constructed as not to interfere with the movements of the fingers, and the further treatment depends on the amount of extravasated blood.

If no marked extravasation exists on the third or fourth day the splint is removed, wrist joint and fingers are actively and passively exercised, then massage used to hand and forearm. Plaster of Paris bandage applied which is removed in a week when further massage is used and splint reapplied. On the fifteenth or eighteenth day the fracture is sufficiently consolidated to permit permanent removal of the splint and patient is allowed to gently use his hand.

Should there be much extravasation the limb is fixed on a Schede's splint and over this a Martin's bandage is carefully and lightly applied. The bandage is to extend from middle of metacarpus to middle of forearm, and is to be readjusted every day.

Compression is to be kept up as long as marked swellings exists.

On the fourth day splint taken off, active and passive motion of hand and fingers and massage, dressing reapplied. Passive motion and massage to be used daily till the extravasated blood is absorbed, this usually occurs about the seventh or ninth day after injury. Further treatment is the same as mentioned above.

Massage is not to be used before the fourth day, as manipulations may give rise to fresh extravasations of blood. During massage hand and forearm are to be held by an assistant so as to prevent motion taking place at the point of fracture.

Forty-one (41) cases thus treated have given most satisfactory results. In the majority of cases the patients were able to use their hand on the fifteenth or eighteenth day after injury. In the worst cases the treatment was extended over a period of four (4) weeks.

Much the same plan of treatment is used in fractures of the lower articular end of humerus.

The limb is enveloped in a thin layer of cotton extending from wrist joint to middle of arm, and light compression is made by means of a flannel bandage, and limb placed on a splint. The splint used by the author is a modified Levis, which can be fixed at any angle,

and is applied to flexor surface of limb, the forearm being in full supination. In most cases this splint can be used throughout the whole course of treatment, Plaster of Paris only used in cases where it is difficult to maintain the fragments in their proper place.

When there is not much extravasation the splint may be taken off every four or five days and gentle passive motion made and massage of arm and forearm. In most cases about the fifteenth or seventeenth day consolidation has sufficiently taken place to allow permanent removal of dressings.

In severe cases and where much blood has been extravasated, the treatment is slightly modified. Martin's bandage applied over splint, and readjusted every day. On fifth or sixth day passive motion begun. Absorption of effused blood takes place about ten or twelve days after injury. Plaster of Paris bandage then used, and is removed and reapplied every five or six days, massage and passive motion being used. The position of elbow is changed at each dressing. The result in ten cases thus treated left nothing to be wished for.

The treatment by immovable dressings is never to extend beyond a period of three weeks, even in the worst cases.

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